

ABSTRACT OF THE DISCLOSURE

A method and system for efficient synthesis of photorealistic free-form knitwear, where a single cross-section of yarn serves as the basic primitive for modeling entire articles of knitwear. This primitive, called the lumislice, describes radiance from a yarn cross-section based on fine-level interactions, including occlusion, shadowing, and multiple scattering, among yarn fibers. By representing yarn as a sequence of identical but rotated cross-sections, the lumislice can effectively propagate local microstructure over arbitrary stitch patterns and knitwear shapes. This framework accommodates varying levels of detail and capitalizes on hardware-assisted transparency blending. To further enhance realism, a technique for generating soft shadows from yarn is also introduced.